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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/606,252 06/28/00 MADURAWA

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EXAMINER

BROCK II, P

ART UNIT

PAPER NUMBER

2815

DATE MAILED:

01/05/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/606,252	Applicant(s) MADURAWA ET AL.	
	Examiner Paul E Brock II	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/28/00 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 20) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Objections

2. Claim 27 is objected to because of the following informalities: In the preamble to the claim the word "an" is missing and should be inserted such that the claim reads "...a transistor in an integrated circuit...". Appropriate correction is required.
3. Claim 35 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 27. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claiming the first and second pocket implants in the same line of claim 35 as opposed to different lines in claim 27 does not render claim 35 different than claim 27. Also, the addition of the wording "...to increase a reverse short channel effect of the transistor." does not add any patentable weight to claim 35.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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5. Claims 21 – 26 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is not clear how a single mask can be used to accomplish depositing a field implant, depositing a well implant and depositing an enhancement implant.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 37 recites the limitation "the semiconductor implant" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

For the purposes of this office action "the semiconductor implant" in line 2 of claim 37 will be considered "the semiconductor substrate."

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

9. Claims 27 – 31 and 33 – 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Kao et al.

With regard to claim 27, Kao et al. discloses in figure 2a – 2g a method of fabricating a transistor in an integrated circuit device. Kao discloses providing a semiconductor substrate (204), forming a gate oxide (206) on the semiconductor substrate and forming a gate (210) on the

gate oxide in figure 2a. Kao discloses in figure 2c implanting a first pocket implant (222 and 214) into the semiconductor substrate from a first side of the gate. Kao discloses in figure 2c implanting a second pocket implant (222 and 216) into the semiconductor substrate from a second side of the gate. It is inherent that Kao discloses diffusing the first pocket implant and the second pocket implant laterally in the semiconductor substrate.

With regard to claim 29, Kao et al. discloses in column 4, lines 53 – 56 the first pocket implant and the second pocket implant are implanted at an angle.

With regard to claim 30, Kao et al. discloses in column 4, lines 45 – 49 the first pocket implant and the second pocket implant are implanted using the gate as a mask.

With regard to claim 31, it is inherent in the method of Kao et al. that the diffusing increases a reverse short channel effect of the transistor.

With regard to claim 33, Kao et al. discloses in column 5, lines 13 – 32 forming a source on the first side of the gate and a drain on the second side of the gate, wherein the source and drain are doped at a first polarity and the first pocket implant and the second pocket implant are doped at a second polarity.

With regard to claim 34, Kao et al. discloses in column 5, lines 13 – 32 that the first polarity is different than the second polarity.

With regard to claim 35, Kao et al. discloses in figure 2a – 2g a method of fabricating a transistor in an integrated circuit device. Kao discloses providing a semiconductor substrate (204), forming a gate oxide (206) on the semiconductor substrate and forming a gate (210) on the gate oxide in figure 2a. Kao discloses in figure 2c implanting a first pocket implant (222 and 214) and a second pocket implant (222 and 216) into the semiconductor substrate using the gate

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as a mask. It is inherent that Kao et al. discloses diffusing the first pocket implant and the second pocket implant laterally to increase a reverse short channel effect of the transistor.

With regard to claims 28 and 36, Kao et al. discloses in figures 4a and 4b all of what is included in claims 27 and 36, and the first pocket implant is in contact with the second pocket implant.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 32 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. as applied to claims 27 and 35 above, and further in view of Gilgen et al.

Kao et al. does not disclose implanting an enhancement implant. Gilgen et al. teaches in figure 8 and column 6, lines 56 – 62 implanting an enhancement implant in the semiconductor substrate. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the enhancement implant of Gilgen et al. in the method of Kao et al. in order to adjust the threshold voltage of a device as stated by Gilgen et al. in column 6, lines 56 – 62.

Cl. 3pt
12. Claims 21 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilgen et al. in view of Stolmeijer et al.

Gilgen et al. discloses in figures 1 and 6 – 8 a method of fabricating an integrated circuit. In figures 7 and 8 Gilgen et al. discloses depositing a field implant (62). In figure 1 Gilgen et al. discloses depositing a well implant (15). In figure 8 Gilgen et al. discloses depositing an

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enhancement implant. Gilgen et al. does not disclose depositing a field implant, depositing a well implant, and depositing an enhancement implant using a single mask. Stolmeijer et al. teaches in figure 1 using a single mask to do three separate implants. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the single mask of Stolmeijer et al. in order to complete the three implants of Gilgen et al. in order to realize n-wells and p-wells by means of only a single implantation mask as stated by Stolmeijer et al. in column 2, lines 36 – 39.

With regard to claim 22, Gilgen et al. discloses in figure 4 that the well implant is an n-well.

With regard to claim 23, Gilgen et al. does not disclose the well implant as an n-well. It is well known in the art to use the same process to form an n-well or a p-well by simply changing the dopant. The process is the same while the result is different. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use a p-well implant instead of an n-well implant in order to create an n-channel gate instead of a p-channel gate.

13. Claim 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Gilgen et al. in view of Stolmeijer et al. as applied to claim 21 above, and further in view of Icel et al.

Gilgen et al. in view of Stolmeijer et al. does not disclose forming a high voltage native transistor. Icel et al. teaches in figure 3 forming a high voltage native transistor (45) by blocking a well implant (13) and an enhancement implant, as stated in column 7, lines 25 and 26, and offsetting the field implant (48) from an active area of the native transistor, thereby obtaining high gated-diode junction breakdown characteristics. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the formation of a native

transistor of Icel et al. in the method of Gilgen et al. in view of Stolmeijer et al. in order to have a native transistor with threshold voltage around 0 volts as stated by Icel et al. in column 7, lines 26 and 27.

14. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilgen et al. in view of Stolmeijer et al. as applied to claim 21 above, and further in view of Kao et al.

Gilgen et al. in view of Stolmeijer et al. does not disclose implanting a pocket or depositing two pocket implants. Kao et al. teaches in figures 4a and 4b, and columns 6 and 7, lines 43 – 67 and 1 – 9 the use of pocket implants. In figure 4a Kao et al. teaches implanting a pocket implant (460) to improve a punch-through immunity. In figure 4b depositing two pocket implants and merging the pocket implants together (460). It is inherent that the pocket implants of Kao et al. are merged together by lateral diffusion, whereby a channel doping profile from the pocket implant diffusion exhibits reverse-short-channel effect. It would have been obvious at the time of the present invention to use the pocket implant method of Kao et al. in the method of Gilgen et al. in view of Stolmeijer et al. in order to avoid short channel effects as stated by Kao et al. in column 7, lines 16 – 18.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsui discloses a method for reduction of reverse short channel effect in a MOSFET. Tseng et al., Shirato et al. and Bossous et al. disclose the use of various implants. Yuki et al. discloses pocket implant regions diffused together under a gate. Liou et al., Tsai et al., Anjum et al. and Arimura et al. all disclose the use of pocket implants.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II
January 3, 2001



EDDIE C. LEE
PRIMARY EXAMINER.